



UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/005,363	11/08/2001	Reinhold Kraus	22750/502	7893
26646	7590	05/05/2004	EXAMINER	
KENYON & KENYON ONE BROADWAY NEW YORK, NY 10004			PICKARD, ALISON K	
			ART UNIT	PAPER NUMBER

3676

DATE MAILED: 05/05/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/005,363

Applicant(s)

KRAUS, REINHOLD

Examiner

Alison K. Pickard

Art Unit

3676

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☐ Responsive to communication(s) filed on ____.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-16 is/are pending in the application.
- 4a) Of the above claim(s) ____ is/are withdrawn from consideration.
- 5) ☒ Claim(s) 9-16 is/are allowed.
- 6) ☒ Claim(s) 1-8 is/are rejected.
- 7) ☐ Claim(s) ____ is/are objected to.
- 8) ☐ Claim(s) ____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on ____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
a) ☐ All b) ☐ Some * c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
 - ☐ Certified copies of the priority documents have been received in Application No. ____.
 - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. ____. |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date ____. | 6) <input type="checkbox"/> Other: ____. |

DETAILED ACTION

Claim Rejections - 35 USC § 103

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

2. Claims 1-4 are rejected under 35 U.S.C. 103(a) as being unpatentable over Borrino (5,529,315) in view of Matsumoto (6,528,168).

Borrino discloses a mechanical seal comprising a sliding ring 100 attached to a shaft for rotation by an o-ring 158, and a non-rotating backing ring 110 attached to a housing 128 by an o-ring 124. A spring 146 presses the rings together to form a seal. Borrino discloses that the sliding ring is made of carbon and the backing ring 110 is made of silicon carbide (see col. 10, lines 20-21). Borrino does not disclose that one of the rings is made of a carbon/silicone carbide composite material. Matsumoto teaches a carbon/silicone carbide composite material that is used for sliding members because of its excellent resistance to wear and self-lubricating properties. Matsumoto teaches using a carbon substrate (i.e. ring 100) and forming a C/SiC layer on the surface. The silicon conversion rate is in a range of 50 to 30% (col. 3, lines 16-20), which falls within the 60 to 15% range required by the claims. (Likewise, the carbon content falls in the required range.) Therefore, it would have been obvious for one of ordinary skill in the art at the time the invention was made to modify the carbon ring 100 of Borrino by forming the C/SiC composite material as taught by Matsumoto to provide excellent self-lubricating and wear resistance.

Art Unit: 3676

3. Claims 5-8 are rejected under 35 U.S.C. 103(a) as being unpatentable over Borrino in view of Matsumoto as applied to claims 1-4 above, and further in view of Divakar (5,834,387).

Neither Borrino nor Matsumoto disclose a silicon carbide with a pore size not greater than $60\mu\text{m}$ at porosity of 2 to 15% or the roughness values required by the claims. Divakar teaches optimum pore size, porosity, and roughness for mechanical seal members. Divakar teaches forming a silicon carbide ring with a mean pore size of not greater than $60\mu\text{m}$ (the range 50 to 500 covers 60 and below, see col. 3, lines 33-36) at a porosity of 2 to 12%, which is within 2 to 15% required by the claims. Divakar teaches that this pore size and porosity improves the rings ability to retain a hydrodynamic film and thus ensure a better seal. Therefore, it would have been obvious for one of ordinary skill in the art at the time the invention was made to modify the mechanical seal of Borrino in view of Matsumoto with the porosity and pore size taught by Divakar to ensure a better seal that retains a good hydrodynamic film and has an improved wear rate.

Allowable Subject Matter

4. Claims 9-16 are allowed.

Response to Arguments

5. Applicant's arguments filed 2-2-04 have been fully considered but they are not persuasive.

In response to applicant's argument that the cited reference do not disclose the combination of a silicon carbide ring and a silicon carbide composite ring, the test for obviousness is not whether the features of a secondary reference may be bodily incorporated into the structure of the primary reference; nor is it that the claimed invention must be expressly

Art Unit: 3676

suggested in any one or all of the references. Rather, the test is what the combined teachings of the references would have suggested to those of ordinary skill in the art. See *In re Keller*, 642 F.2d 413, 208 USPQ 871 (CCPA 1981). In this case, Matsumoto is being applied for its teaching of making a carbon/silicon carbide ring from a carbon ring. Matsumoto teaches that this composite material has an excellent wear resistance as well as oxidation resistance, impermeability, and mechanical strength. Matsumoto acknowledges the deficiencies of prior art carbon rings (such as the ring in Borrino). Matsumoto's teachings of improved resistance (see col. 1, line 67) (etc.) provide motivation to modify the prior art ring to improve its deficiencies. As for an expectation of success, based on the teachings of Matsumoto as well as that of other prior art, such as WO '982, Ogawa '732, or Coppella '653, one of ordinary skill in the art would be confident that a C/SiC ring would provide excellent wear resistance, mechanical strength, etc. In other words, the motivation to modify the ring (as well as the expectation of success) is to provide an improved sealing ring within the arrangement of Borrino. The fact that applicant has recognized another advantage (i.e. that such a ring seals well against a silicon carbide material) which would flow naturally from following the suggestion of the prior art cannot be the basis for patentability when the differences would otherwise be obvious. See *Ex parte Obiaya*, 227 USPQ 58, 60 (Bd. Pat. App. & Inter. 1985).

Conclusion

6. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

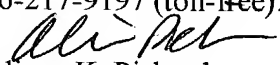
Art Unit: 3676

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Alison K. Pickard whose telephone number is 703-305-0882. The examiner can normally be reached on M-F (10-7:30), with alternate Friday's off.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Judy Swann can be reached on 703-306-4115. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).


Alison K. Pickard
Primary Examiner
Art Unit 3676

AP